COOL-SEASON TURF DISEASES

by Dr. Joe Vargas, Michigan State University

A good deal of research in the area of turfgrass diseases has turned to biological management. Biological management of necrotic ring spot, summer patch and typhula blight has been demonstrated.

Another area of interest has been the re-occurrance of resistance to fungicides by turfgrass pathogens, this time involving the pythium blight pathogen *Pythium aphanidermatum* and the anthracnose fungus *Colletotrichum graminicola*. These subjects and many more concerning the current status of turfgrass diseases are discussed in this article.

These diseases, the organisms that cause them, and their cultural, biological and chemical management tools are given in Table 1.

New strains of pythium are more aggressive than older, wild type strains.

Biological management

Necrotic ring spot. It now appears that necrotic ring spot, caused by *Leptosphaeria korrae*, is the primary patch disease found on Kentucky bluegrass in the cooler regions of the cool-season turfgrass area. The symptoms can be observed throughout the growing season even though *L. korrae* appears to be most active during the cooler weather of the spring and fall.

The plants that were infected by *L. korrae* in the cooler weather are in a weakened condition and are very susceptible to summer heat stress or drought stress. Subjecting the necrotic ring spot plants to either of these stresses will lead to the death of the weakened plants and the recurrence of symptoms, even though the pathogen may not be active at this time. The symptoms during cool weather are patches six inches to two feet in diameter with straw- to red-colored blades intermingled in the patch.

Older patches may have green grass in their centers with the straw- to red-colored blades in the outer area of the patches. When the disease symptoms occur during the warm weather the red blades are often scarce and usually only straw-colored or wilted leaves are present.

Nitrogen is important for recovery of the patches caused by necrotic ring spot. Three to five pounds of actual nitrogen per 1,000 sq. ft. per season is necessary to promote recovery and to prevent new patches from developing.

Proper cultural practices are also important in patch recovery and in the prevention of new patches. These include coring to relieve compaction and layers that result when sod of one soil type is laid on top of soil of another type, which is common practice during the establishment of home lawns and commercial lawn properties. This results in short rooting during the warm weather (when the roots of the turfgrass plant are confined to the upper layer).

Coring and re-incorporating the soil back into the thatch will, over a period of years, alleviate the layering problem. It may also help manage any potential thatch problem, which is important in managing necrotic ring spot.

Thatch has a poor moisture-holding capacity and turfs growing in a thick thatch are more susceptible to drought stress. Light, frequent irrigation is also important in managing this disease. The theory that deep, infrequent irrigation is more beneficial to turf development is just that, a theory. Preliminary research data indicates that light, frequent waterings may be more beneficial to the turf. Such wa-

terings on a daily basis, around midday, have been shown to help manage necrotic ring spot.

The turf appears to be benefitting culturally from the cooling of the turf and biologically from the build-up of beneficial micro-organisms in the moist thatch that may be antagonistic to *L. korrae*. There are also some new products that help manage the disease biologically.

Lawn Restore, produced by the Ringer Corporation, is a natural organic product that is a complete fertilizer containing all the major nutrients as well as some benefical microorganisms that produce substances under laboratory conditions that are antagonistic to the pathogen *L. korrae*. It has also been shown to manage necrotic ring spot under field conditions. Lawn Restore has been effective in both promoting the recovery of existing necrotic ring spot patches and preventing the development of new ones.

Another group of products produced by the Agro-Chem Co. (Green Magic, Strengthen and Renew and Nutra Aid), when used in a systematic program, also have been shown to manage necrotic ring spot under field conditions. They appear to improve the environment and allow an increase in the natural population of beneficial organisms in the soil and thatch.

The key word is "management." These products are not a one-shot cure, but used systematically on a regular basis, they will manage the disease and provide a healthy turf.

Typhula blight. Typhula blight is caused by two species, *Typhula incarnata* and *T. ishikariensis*. *T. incarnata* is the primary species in the eastern U.S. and in southern and mid-regions of the Midwest and western United States. *T. ishikariensis* is most prevalent in the more northern snow mold regions, especially where prolonged periods of permanent snow (two or more months) exist in the midwestern and western U.S.

The two typhula species are easily distinguished from each other when observed soon after the snow melts. *T. incarnata* produces grayish spots in the turf with scattered, fairly large brown sclerotia evident, whereas *T. ishikariensis* spots have a reddish cast to them and contain numerous small, dark black sclerotia.

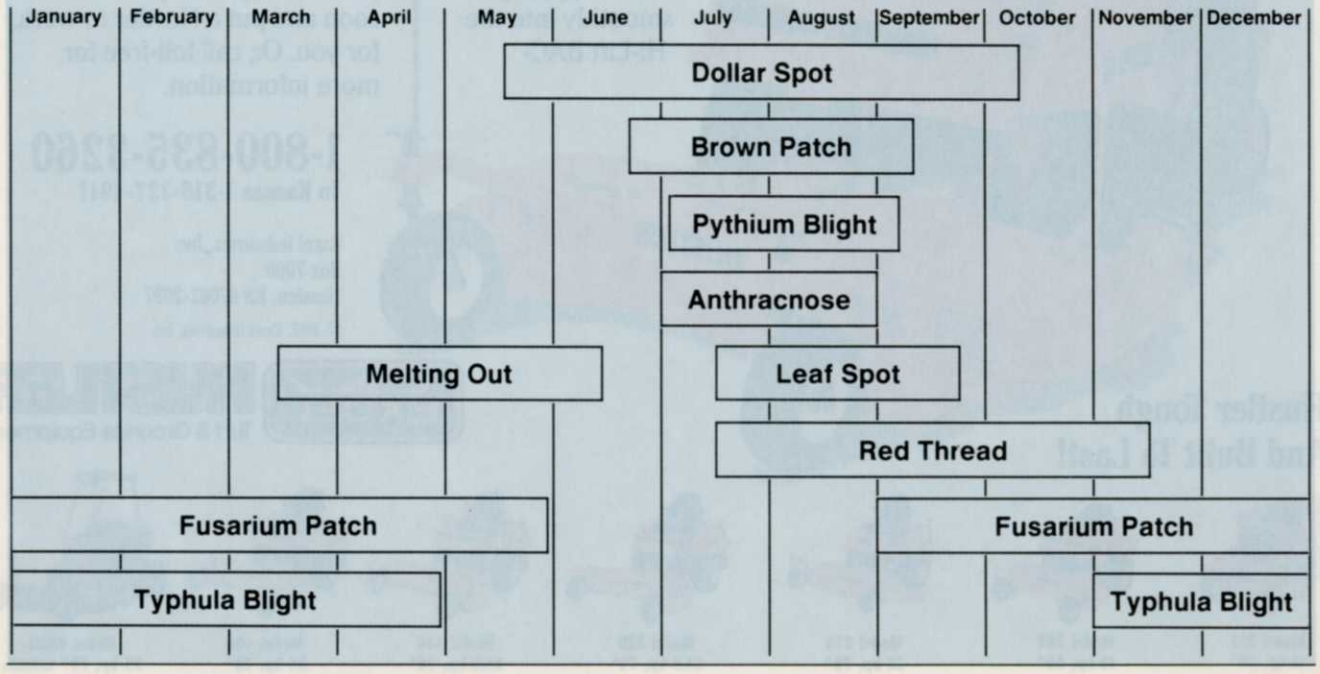
Typhula blight only occurs under snow cover. It does not occur in the cool, wet weather of fall and spring, except under leaf piles. Typhula blight has been, and still is, managed primarly by fungicides (Table 1).

Lee Burpee at the University of Guelph has isolates of a saprophytic typhula species, *Typhula phacorrhiza* that will biologically manage typhula blight caused by *T. ishikariensis*. This biological management of typhula blight was shown to be effective under field conditions in Ontario. Research is currently being conducted to find a way to make this biological management tool commerically available.

New fungicide resistance

Pythium blight. Metalaxyl resistance to pythium blight caused by *Pythium aphanidermatum* was reported back in 1983 by Dr. P. L. Sanders at Pennsylvania State University on a single golf course in Pennsylvania. This past season, she found resistance to matalaxyl

CALENDAR
Major Disease of Cool-Season Turf



in several additional locations in other states. We also found metalaxyl resistant strains of *P. aphanidermatum* at two locations in Kentucky on perennial ryegrass fairways.

We concurred with Dr. Sanders' previous findings that these new strains are far more aggressive than the older, wild type strains. They also appear to be pathogenic over a wider range of temperatures, occuring when temperatures were only in the high 70s.

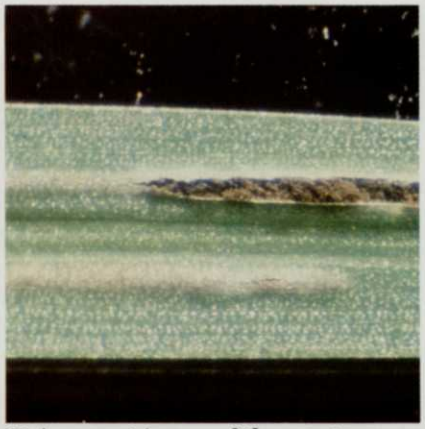
The metalaxyl-resistant strain of *P. aphanidermatum* was not cross-resistant to chloroneb, ethazole, probamocarp or fosetyl A1. These fungicides can be used where these resistant metalaxyl strains occur. How widespread or how persistent these strains will become only time will tell, but a good rule of thumb is that if these strains are going to occur, they will begin to show up the second or third year, especially if multiple applications of metalaxyl are made during the first two seasons.

The fact that the perennial ryegrasses are super susceptible to pythium blight combined with the development of the highly aggressive metalaxyl resistant strains of *P. aphanidermatum*, raises serious questions about the use of the perennial ryegrasses in areas of the country where there is a high incidence of pythium blight.

Anthracnose. Resistance to the benzimidazole fungicides (benomyl, thiophanate, thiophanate-methyl) by *Colletotrichum graminicola*, the cause of anthracnose, took much longer to develop than with other fungi like *Erysiphi graminis* (powdery mildew) or *Sclerotinia homeoecarpa* (dollar spot).

Resistance to the benzimidazoles by *E. graminis* and *S. homeoecarpa* usually occurred in the first three years and often in the second year. On the golf courses from which the benzimidazole-resistant strain of *C. graminicola* was isolated, the superintendent had used benzimidazole fungicide for 14 years. Resistant dollar spot had been observed on the course for over 12 years.

The question is, why did resistance to the dollar spot organism show up so quickly, whereas resistance to anthracnose took so long? I think the answer lies in the type of pathogen these two fungi are.



Stripe smut is one of the most devastating diseases of turf.

Sclerotinia homoeocarpa germinates and may grow for a short period of time and then infects the plant.

If fungicides like the benzimidazoles eliminate sensitive strains from the population, *S. homoeocarpa* is not capable of growing saprophytically after the fungicide has disappeared from the environment in order to re-establish itself throughout the turf area. This allows resistant strains, which are in low numbers in the population, to infect the turf and begin to build up their numbers quickly in the absence of competition from the benzimidazole-sensitive wild type strains. Under such conditions, the benzimidazole-resistant strains can build up rapidly in the turf.

Colletotrichum graminicola, on the other hand, spends much of its life living as a saprophyte in the thatch and mat on dead organic matter when it is not a pathogen. So, when fungicides like the benzimidazoles eliminate sensitive strains from the population, the survivors can grow saprophytically and build up the population again.

With this type of competition, it would take benzimidazole-resistant strains many years to build up large enough numbers to become the dominant strain in the population. The message is that those of you who have been using the benzimidazoles for many years should be on the lookout for the emergence of benzimidazole-resistant strains of *Colletotrichum graminicola*. Don't be lulled into thinking that if resistance hasn't occurred by now, it won't occur.

Managing stripe spot

This disease, caused by *Ustilago striiformis*, is one of the most devastating diseases of turf. The patch diseases have certainly received all the notoriety in home lawn turf problems but more turf has been lost to stripe smut.

The reason stripe smut doesn't recieve all the notoriety is that, in most instances, it is a slower-acting disease that weakens infected plants which are then crowded out by weeds or die under stress randomly as individual plants rather than as large areas dying all at once. The remaining stripe smut infected plants are too weak to fill in the voids and this allows weeds to enter in the turf. If the weeds are broadleaf or annual grasses, like crabgrass, then selective herbicides can be used to remove them.

However, unlike healthy Kentucky bluegrass, the weakened stripe smut-infected plants cannot fill in the voids where the weeds were selectively removed and eventually the perennial weedy grasses like tall fescue and quackgrass fill in these voids. A total renovation of the existing turf is the only solution to a lawn infested with perennial weedy grasses since there are no selective herbicides.

What makes stripe smut such a devastating disease is that it is a systemic perennial disease. This means that once a plant is infected it will remain so for life. Any daughter plants arising from an infected mother plant via rhizomes or stolons will also be infected. So, unlike most other diseases, infection does not have to take place every year. All that's needed is environmental stress for this stripe smut weakened plant to die.

The foliar symptoms are most evident during the cool weather of spring and fall when the fungus grows

throughout the veins of the plant, eventually producing spores which rupture the epidermis, causing the leaves to have a frail, torn appearance.

Though the symptoms are most evident in the cool weather of the spring and fall, most of the turf infected with stripe smut dies in the summer when the turf is allowed to go under drought stress. This may be due to the plant's inability to conserve moisture because of its torn epidermis or its general weakened condition.

When healthy Kentucky bluegrass is allowed to go under drought stress, it will go dormant and green up again with the occurance of late summer or early fall rains. Kentucky bluegrass turf infected with stripe smut, however, will die if allowed to undergo drought stress.

The fact that the disease is systemic suggests that there is little resistance in the plant. Resistance is

COOL-SEASON TURF DISEASES
TABLE 1
TURF DISEASE AND CONTROLS

Disease	Causal Agent	Hosts	Biologial and Cultural Control	Chemical Control
Anthracnose	*Colletotrichum graminicola*	Annual bluegrass Fine-leaf fescue Kentucky bluegrass Perennial ryegrass	Adequate nitrogen. Cool grass by syringing.	Maneb plus zinc sulfate, chlorothalonil, benomyl, thiophanate-methyl, thiophanate, thiophanate-methyl + mancozeb, triadimefon
Brown patch	*Rhizoctonia solani*	All major turfgrass species	Reduce nitrogen. Remove "dew." Increase air movement.	Mancozeb, maneb + zinc sulfate, chlorothalonil, anilazine, vinclozolon, benomyl, thiophanate-methyl, thiophanate, thiram, thiophanate-methyl + maneb, cadmium compounds, thiophanate + thiram, PCNB, iprodione
Dollar spot	*Lanzia spp.* *Moellerodiscus spp.*	Annual bluegrass Bahiagrass Bermudagrass Centipedegrass Colonial bentgrass Fine-leaf fescues Kentucky bluegrass Perennial ryegrass St. Augustinegrass Zoysiagrass	Increase nitrogen. Remove "dew."	Benomyl, thiophanate, thiophanate-methyl, chlorothalonil, anilazine, fenarimol, cadmium compounds, thiophanate + thiram, thiram, thiabendazole, benomyl, iprodione, thiophanate-methyl + maneb, vinclozolin, triadimefon
Summer patch	*Phialophora graminicola*	Annual bluegrass Kentucky bluegrass	Light, daily watering during the summer.	Fenarimol, thiophanate-methyl, thiophanate, triadimefon, iprodione, benomyl
Helminthosporium Diseases Brown blight Leaf blotch Melting-out Net blotch Read leaf spot Stem and crown necrosis Zonate Eye spot Leaf spot	(Dreschlera) *D. siccans* *D. cynodontis* *D. poae* *D. dictyoides* *D. erythrospila* *D. specifera* *D. gigantea* *Bipolaris sorokiniana*	 Ryegrass Bermudagrass Kentucky bluegrass Fescue Creeping bentgrass Bermudagrass Bermudagrass Bentgrass Fine-leaf fescue, Kentucky bluegrass	 Remove clippings. Raise cutting height. Plant resistant cultivars. Moderate spring nitrogen. Daily irrigation.	 Mancozeb, chlorothalonil, iprodione, anilazine, maneb + zinc sulfate, PCNB, vinclozolin

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expressed as keeping the infection localized, that is, small spots on the leaves, as in the case of the rust diseases. Leaf rust and stem rust are considered minor diseases of turf because they tend to produce localized lesions whereas stripe rust is a major disease because it is systemic in the plant, indicating little resistance.

Until recently, a stripe smut-infected turf was subject to a slow but inevitable death, eventually being taken over by perennial weeds, which meant the turf had to be killed by a herbicide like Roundup and completely renovated. However, the development of triadimefon and fenarimol has changed all that. These two fungicides, used on a regular basis, will manage stripe smut.

The first application should occur in the spring just before the turf breaks dormancy, followed by a second application just prior to the summer heat stress period and a third application when the cool nighttime temperatures of the late summer or early fall return.

Other patch diseases

Summer patch. It has become increas-

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COOL-SEASON TURF DISEASES
TABLE 1
TURF DISEASE AND CONTROLS

Disease	Causal Agent	Hosts	Biologial and Cultural Control	Chemical Control
Take-all patch	*Gaeumannomyces graminis*	Creeping bentgrass Kentucky bluegrass Velvet bentgrass	Reduce soil pH. Avoid liming, Use acidic fertilizers. Sulfur	Fenarimol
Pythium blight (cottony blight)	*Pythium spp.*	Perennial ryegrass Creeping bentgrass Annual bentgrass	Improve soil drainage. Increase air circulation.	Chloroneb, ethazol, metalaxyl, propamocarb
Red thread	*Laetisaria fuciformis*	Creeping bentgrass Colonial bentgrass Bermudagrass Annual bluegrass Perennial ryegrass Fine-leaf fescue	Increase nitrogen.	Anilazine, iprodione, triadiefon, vinclozolin, chlorothalonil
Pink patch	*Limonomyces roseipellis*	Perennial ryegrass Creeping bentgrass Fine leaf fescue	Increase nitrogen.	Try red thread fungicides
Snow molds Typhula blight Fusarium patch	*Typhyla spp.* *Fusarium nivale*	Annual bluegrass Colonial bentgrass Creeping bentgrass Fine-leaf fescues Kentucky bluegrass Perennial ryegrass Tall fescue Velvet bentgrass	Avoid early fall nitrogen fertility that leads to lush growth.	Mercury compounds, PCNB products, chlorothalonil, chloroneb. These products may have to be used in combination for effective snow mold management. Benomyl, iprodione, or mancozeb will control Fusarium patch where it occurs alone.
Necrotic ring spot	*Leptosphaeria korrae*	Kentucky bluegrass	Nitrogen to promote recovery. Light daily irrigation. Lawn Restore, Green Magic, Strengthen & Renew.	Iproione, fenarimol, benomyl, thiophanate, thiophanate-methyl
Stripe smut	*Ustilago striiformis*	Kentucky bluegrass Creeping bentgrass	Reduce nitrogen. Prevent summer dormancy.	Fenarimol, triadimefon

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ingly evident over the past few years that summer patch, caused by *Phialophora graminicola*, is a primary disease of annual bluegrass during warm weather. It can also be found on Kentucky bluegrass and fine-leaf fescues, especially in the warmer areas of the cool-season grass region.

On annual bluegrass, the initial symptoms are a yellowing of the turf in patches, usually six inches to one foot in diameter, followed by a thinning of the turf, with the remaining turf turning bronze in color. If warm weather persists, all the turf in the patches may die.

Most of the creeping bentgrass cultivars are resistant and creeping bentgrass frequently can be seen recolonizing the centers of these patches. Preliminary data indicate that soil temperature and soil moisture may be important in the development of this disease.

Both excessive and limiting soil moisture during periods of hot weather may result in severe outbreaks of summer patch. Lighter and more frequent irrigations should help reduce the severity of summer patch.

Take-all patch. Take-all patch, caused by *Gaeumannomyces graminis var. avenae* was formerly known as ophiobolus patch caused by *O. graminis*. This disease was originally thought to be confined to the Pacific Northwest. It has now been reported throughout the United States and Canada wherever creeping bentgrass is grown.

Effective chemicals

Fungicides for the management of the patch diseases and how to use them are discussed below:

Benomyl, thiophanate and thiophanate-methyl. These fungicides will manage all three diseases. They are all basically the same chemistry as far as mode of action is concerned. They are also systemically translocated upward and outward from where they enter the plant. For fungicides to be effective against these root pathogens, they need to be drenched into the soil where they can be taken up by the roots. If they are allowed to dry on the foliage, they will not manage the patch diseases.

For best results the area to be treated should be irrigated just prior to treatment.

Fenarimol. This fungicide will also manage all three patch diseases and does not need to be drenched in to be effective. For management of summer patch on annual bluegrass, treatments should be applied early in the season before the temperatures go into the 80 degrees Fahrenheit range on a permanent basis.

Iprodione. This fungicide is effective against necrotic ring spot and does not need to be drenched in to be effective.

Triadimefon. This fungicide is effective against summer patch and does not need to be drenched in to be effective. There are some reports in the literature that suggest this product is only effective against summer patch when applied as a preventive treatment. **LM**

WARM-SEASON TURF DISEASES

by Dr. Don Blasingame, Mississippi State University

Managers of southern turf not only fight diseases of six different warm-season turf species, but also diseases of overseeded cool-season turf species.

Although most southern turf diseases are caused by fungi, agents such as bacteria, viruses and nematodes can cause serious problems to certain grasses.

Southern turf managers can't depend solely on fungicides for disease control. Good variety selection, proper fertilization and appropriate cultural practices are very important in disease control.

No amount of fungicide will compensate for poor fertility and cultural practices. Knowing when the most common diseases occur also will aid managers in scheduling fungicide applications (see chart).

Brown patch

Brown patch is the most common turf disease in the Southeast. Although St. Augustine and zoysiagrass are the most susceptible species, even the more tolerant centipedegrass, Bermudagrass and ryegrass are frequently damaged by this fungus.

Brown patch is favored by warm, moist weather combined with cool nighttime temperatures. Therefore, in certain areas of the South, brown patch can and does occur any month of the year.

In the upper regions of the South, the most favorable conditions for brown patch development occur from late April through mid-October.

Symptoms of brown patch on warm-season grasses are different than the symptoms of the disease on cool-season turf. Even though the grass is usually killed in a circular pattern, many times the smoke ring is not seen on southern turf.

Under certain conditions the fungus may cause a gradual thinning of the turf over a rather large area instead of killing in a circular pattern.

Several factors tend to make the grass more suceptible to brown patch. One is the excessive application of nitrogen fertilizer. The resulting lush growth is readily attacked.

Another is watering late in the afternoon and allowing the grass to remain wet for long periods of time. Excessive accumulation of thatch also creates a favorable environment for the development of brown patch and many other diseases.

Fungicides are best used on a preventive schedule. Once symptoms develop, control can be difficult.

Spring dead spot is a serious disease of Bermudagrass in the upper sunbelt.

Dollar spot

Dollar spot is common on Bermudagrass, zoysiagrass and annual and perennial bluegrasses.

Symptoms of dollar spot are different on certain warm-season grasses than those noted on cool-season grasses.

On finer textured grasses, such as Bermudagrass and zoysiagrass, the disease kills grass in small patches two to three inches in diameter. Under severe conditions, these patches may coalesce so that the turf has a mottled appearance. Blades of grass at the outer edges of the infected area develop tan spots with reddish brown margins.

On coarser warm-season grasses, turf is killed in larger patches ranging up to a foot in diameter.

Dollar spot is prevalent during periods of mild weather in the spring and fall.

Unlike brown patch, dollar spot is retarded by high levels of nitrogen. Still, turf managers should consider the impact of high nitrogen on brown patch and other diseases.

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Watering should be performed only in the early morning so the foliage can dry quickly. Fungicides can be used to help bring the disease under control once it gets established.

Leaf spots

A number of fungi cause leaf spots on many southern grasses. Regardless of the causal agent, leaf spots and their control on southern grasses are similar.

Melting out (*Bipolaris* spp.)—Bermudagrass and ryegrass are most severely affected by these infections, although the fungus can survive on centipedegrass and St. Augustine.

Infection can occur over a wide range of temperature, but usually is more severe at 70 to 95 degrees Fahrenheit. Milder temperatures in the spring and fall are more favorable for infection.

Melting out causes small, dark-colored spots or flecks on the leaves and sheaths. Leaf spots are usually more numerous near the collar of the leaf blades. Severely affected leaves wither and die and the turf frequently becomes brown and thin.

Symptoms on overseeded ryegrass are altogether different. Although leaf spots may occur, this same melting out can cause severe crown rot. This causes a yellowing and discoloration of the grass and a general thinning of the turf.

Fertilize with adequate levels of nitrogen and potassium if melting out diseases become a problem. With careful management, apply fungicides recommended for melting out blight control.

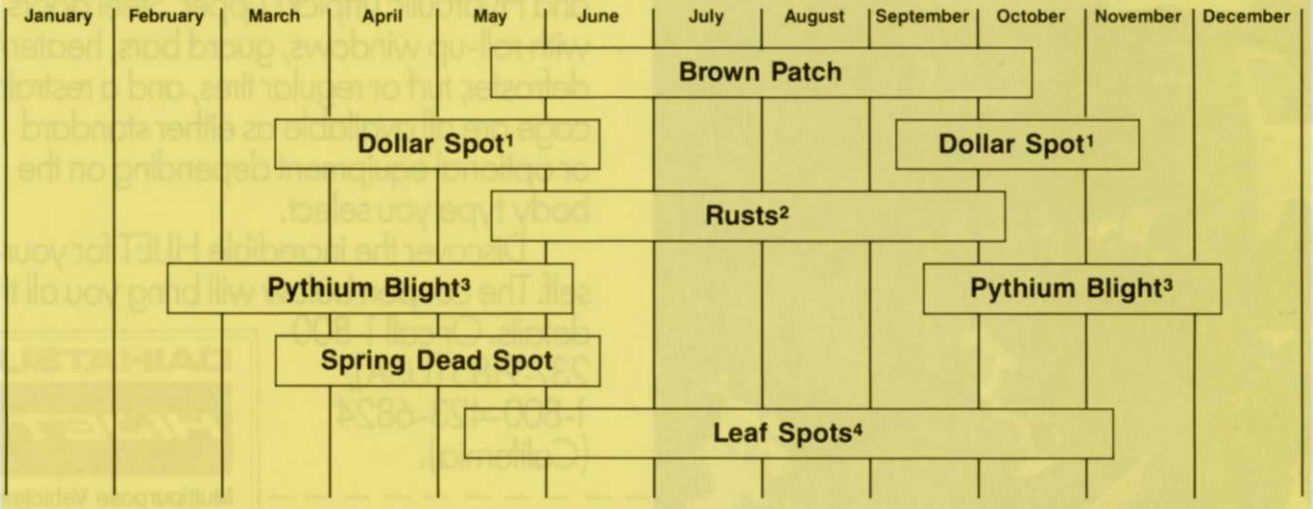
Gray leaf spots—St. Augustinegrass is the primary host for gray leaf spot. The disease occurs throughout the lower South during warm, humid weather.

Spots on the leaf blades are the most visible, but sheath and stem lesions also occur. Leaf spots begin as olive green to brown, water-soaked spots as small as a pinhead. These enlarge rapidly and form a circular to elongated lesion that is brown to ash colored with purple margins.

The disease occurs during moderate to warm weather accompanied by high relative humidity. Severity of the disease is enhanced by applica-

CALENDAR

Major Diseases of Warm-Season Turf*



*** The calendar gives the normal time for turf diseases to occur. However, they may occur at other times depending upon environmental conditions.**

1 - Dollar spot affects overseeded turf as well as warm-season grasses.

2 - Rust does affect overseeded grasses but is most common on zoysiagrass.

3 - Pythium blight is most damaging on overseeded turf but can cause damage to warm-season turf especially during "transition" periods.

4 - Most warm-season grasses are affected by certain leaf spots. For example: gray leaf spot of St. Augustine and the helminthosporium complex on Bermudagrass.

tions of nitrogen fertilizer. It is more a problem in shaded areas where the grass remains wet from dew.

Treatment with a fungicide may become necessary if the disease outbreak is severe and accompanied by prolonged periods of wet favorable weather.

The fungicides chlorothalonil, mancozeb and cycloheximide plus thiram have been found to be effective in controlling gray leaf spot.

Rust

Rust or *Puccinia* species infect ryegrass, zoysiagrass, bluegrass, fescue, Bermudagrass and St. Augustine. Zoysiagrass and bluegrass are the most often infected grasses.

Susceptibility depends on the variety. Fungus infection is favored by minimum and maximum temperatures of 50 to 70 degrees Fahrenheit respectively. For this reason, the disease does not usually cause severe damage over an extended period. It is likely to be more severe in shaded areas during rainy, humid weather. Affected turf will appear unthrifty and begin to thin.

The disease is characterized by the presence of pustules on the leaf blades. These pustules range from bright orange to cinnamon-brown in color depending upon the species of fungus present.

Certain varieties of ryegrass are extremely susceptible to rust, and sometimes severe damage can occur. Zoysiagrass, especially Meyer and Emerald, are most severly infected by rust.

Fertilize to stimulate grass growth, mow on a four- to five- day schedule and catch clippings. If necessary, a fungicide may be applied to help reduce the amount of disease present.

Triadimefon, chlorothalonil, mancozeb and cychloheximide are effective in controlling rust.

Spring dead spot

Spring dead spot is a serious disease of Bermudagrass in certain parts of the upper sunbelt. It is found generally on Bermudagrass or zoysiagrass under high maintenance.

Damage to the turf apparently occurs during the dormant season. When greenup occurs in the spring, areas a few inches to several feet in diameter appear where the sod is completely dead.

Spring dead spots' causal agent has not been identified. The only control procedures recommended are good cultural practices and limiting the use of nitrogen fertilizer, especially late in the growing season.

Research has shown that fungicides can limit the damage. However, at the present time only benomyl and PCNB are labeled, and these may be limited uses in certain states.

St. Augustine decline

St. Augustine decline (SAD) is caused by a virus. The symptoms are a mosaic-type chlorosis of the leaf blades that resemble nutrient deficiency or mite feeding. Evidently there are several strains of the virus since there is a great range in damage to St. Augustine.

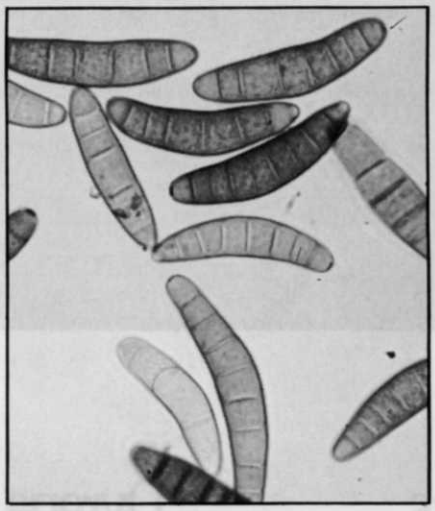
To this point, the disease has only been recorded in Arkansas, Texas, Louisiana and Mississippi. No chemicals are available for the control of SAD.

Several varieties of St. Augustine, however, are resistant to the virus. These can be planted in areas where the disease is a potential problem.

Floratam was the first variety released with resistance to SAD. It is also resistant to chinch bugs. It has poor cold tolerance and should be used only in the lower South.

Seville is resistant to SAD and is more shade tolerant than common St. Augustine. Raleigh has both SAD resistance and good winter hardiness.

Turf managers should consider the impact of high nitrogen on brown patch and other diseases.



Spores of the melting out fungus can easily be spread by wind, rain and equipment.

Downy mildew

Downy mildew of St. Augustine was first described on common St. Augustine in Texas in 1969. Since then the disease has spread and has been identified in Arkansas, Louisiana and Mississippi.

Downy mildew appears as white, raised, linear streaks that develop parallel to the mid-veins of the leaf. Streaks appear in the spring and remain throughout the summer, giving the leaves a yellow appearance with some death toward the tips.

Severe disease occurs in grass grown in flood plains or poorly drained areas.

The white-streak symptom is easily confused with the virus disease, St. Augustine decline. However, the virus symptoms are more yellow in color and more mottled than striped.

Downy mildew has been difficult to control with most common turf fungicides. Good drainage is recommended for cultural control.

Pythium blight

Pythium blight can be a devastating disease on overseeded ryegrasses. Bermudagrass and other warm-season grasses can be affected to a lesser degree.

An abundance of moisture is required for pythium blight development. In addition, the disease is favored by warm temperatures.

Affected grass is killed rapidly in spots two to four inches in diameter. These spots may develop into streaks so that large areas of turf are damaged.

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During early stages of development, the affected grass appears wilted and greasy. At times the affected turf spots may have a cottony appearance due to the abundant growth of the fungus. For this reason, the disease is frequently referred to as cottony blight.

Certain species of pythium can also cause root rot on turtgrasses. Due to the restricted root function, the plants become chlorotic and the turf begins to thin.

On overseeded grasses the disease can be limited by using treated seed and delaying the overseeding until as late as possible during the fall. Water as little as possible during periods of favorable activity. The perennial ryegrasses are not as susceptible as annual. Under severe disease pressure, chemical control may be required.

Fairy rings

Fairy rings generally appear in lawns and other turf areas as circles or arcs of dark green, fast-growing grass during the spring and early summer. A ring of thin dead grass may develop on one or both sides of this circle.

The disease is caused by one of several soil-inhabiting fungi that commonly produce mushrooms. Mushrooms that sometimes appear in the ring are the fruiting bodies of these fungi. Stimulation of the grass is due to release of nutrients from the organic breakdown of the thatch by the growing fungus.

No chemicals are labeled for the control of fairy ring.

Two general approaches may be considered: removal and suppression. Although relatively impractical, removal of infected soil and grass to a depth of 12 inches or more in a band several feet on each side of the infected area and replacement with clean soil is one solution.

Another approach is to suppress the disease. For low-maintenance grass areas, increase the water and fertilization program to stimulate the declining grass inside the ring. Symptoms of fairy ring can be masked by pumping large quantities of water into this area.

Slime molds

Slime molds are a group of organisms that cover above-ground plant parts with a dusty gray-black or dirty yellow mass.

When you look closely at this growth, you see small round balls scattered over the plant. If you rub these between your fingers, a sooty powder emerges. This consists of spores of the fungus.

Slime molds normally live in soil where they feed on decaying organic matter. When the mold is ready to reproduce, it grows up on to the grass blades so that the spores may be spread greater distances.

Slime molds do not feed on living plants. They only use them to assist in the distribution of spores during reproduction.

Slime molds occur during wet weather throughout the spring, summer and fall. They disappear rapidly as soon as it becomes dry. Chemical control is usually not necessary. **LM**